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THIS PUBLICATION GIVES INFORMATION on new developments of interest to agriculture based on the work done by scientists and agricultural field men of the du Pont Company and its subsidiary companies.

It also gives reports of results obtained with products developed by these companies in the field whether the tests are made by field men of the companies, by agricultural experiment stations or other bodies. Also data on certain work done by agricultural stations on their own account and other matters of interest in the agricultural field.

This issue contains:

Control of Corn Ear Worm Sought in Tests of "Cellophane" by New York Experimenter

The Equipment and Procedure for Treating Seed with Dust Disinfectants on a Commercial Scale

Helping the Farmer to Help Himself Can Assist in Solving His Problems

The Relation of Science to the Conservation and Increase of National Wild Life Outlined

Clearing Farm Lands of Obstructions to Shift from Soil-Depleting to Soil-Conserving Crops

The National University of La Plata Issues Reports on Studies in Agronomy in Argentina

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CONTROL OF CORN EAR WORM SOUGHT IN TESTS OF "CELLOPHANE" BY NEW YORK EXPERIMENTER

EDITOR'S NOTE:- This report is given here with a view to making available data which may be of value to other experimenters who are seeking effective means of control of the corn ear worm.

By L. A. Carruth,
New York State Agricultural
Experiment Station.

Through the courtesy of Mr. J. B. Post of the Du Pont Cellophane Company it was possible to use "*Cellophane" cellulose film in the 1935 program of experiments for the control of the corn ear worm, Heliothis obsoleta Fabr., on Western Long Island. The problem of controlling this insect has occupied the attention of entomologists for many years, with but little success. In a search for new materials for attacking the problem it was felt the use of "Cellophane" should be investigated. During 1935 trials with this material were conducted along two general lines:

1. The use of transparent bags, perforated and unperforated, for the protection of growing sweet corn ears in the field.

2. The use of transparent wrappings for the marketing of sweet corn slightly injured by the corn ear worm.

These two uses will be discussed separately below.

How Injury is Caused

It was felt the price paid for high quality, worm-free sweet corn in the New York area warranted an investigation of the feasibility of using coverings for the protection of the growing ears from the attacks of the corn ear worm. Most of the injury produced by the corn ear worm is caused by larvae (worms) which have hatched from eggs laid on the corn silks by the female moths. In these tests it was hoped to cover the ears before any appreciable number of eggs had been laid on the corn silks. It was found this could not be done without interfering with the pollenation of the ears. Perforated bags made of "Cellophane" were used in an attempt to secure pollenation without permitting eggs to be laid on the silks. Preliminary trials showed pollenation was not always satisfactory when the perforated bags were used. In the main experiment, summarized below, the perforated and unperforated bags were used and compared for ear protection from worm injury and for ear

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ventilation, as evidenced by the presence or absence of moisture within the coverings and outside the ears. The unperforated bags made of "Cellophane" were applied after the ears had been pollenated and all visible infestations of eggs and larvae of the ear worm had been removed. The bags were 5-1/2 inches wide and 12 inches long. Rubber bands were used to fasten the bags closely about the ears.

A Summary of Results

The experiment summarized below consisted of a trial of ten types of ear coverings and treatments as well as untreated plots. The complete data have been summarized, together with data from another experiment, in an article submitted for publication in an early issue of the Journal of Economic Entomology. Since reprints of this article will later be available, only the data for the "Cellophane" treatments and for two other treatments of interest will be given. The article mentioned was prepared as a preliminary report and it is felt that final conclusions are not warranted from one season's work. The experiment was conducted near Roslyn, N.Y. on sweet corn of the variety Bantam Evergreen, planted June 27, 1935. The treatments began on August 28, when 35% of the ears were in silk, and were repeated at four intervals, averaging three days each, until all ears were treated or covered. On August 28 it was found that 90% of the ears in silk were infested with eggs and larvae of the corn ear worm. The untreated ears showed approximately this percentage of infestation throughout the experiment. The ears were harvested between September 17 and 26, 1935.

The Method of Checking

The experimental field was laid out in plots four rows wide and twenty feet long. Each treatment extended over six of these plots arranged over the field according to the randomised block system. Due to dry weather during the 1935 season fewer ears were harvested than was planned, although it is felt that the numbers were sufficient to give an indication of the amount cf control produced.

TREATMENT	TOTAL EARS HARVESTED	PER CENT INFESTED	PER CENT UNFIT FOR SALE
Untreated	215	92.6	40.0
Perforated transparent bags made of "Cellophane"	231	72.7	28.1
Plain transparent bags made of "Cellophane"	214	47.2	14.9
Plain kraft paper bags	208	39.9	13.4
**"Dutox" Dust (Grasselli)	181	68.0	36.4

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It will be noted that the best showings were made by the plain bags made of "Cellophane" and the paper bags, although nothing approaching perfect control was reached. Unless a technique can be developed by means of which a higher degree of control can be produced it is questionable whether the cost and labor of covering can be justified. It is felt that the failure of the perforated bags made of "Cellophane" to remain as uninfested as the other coverings may have been at least partly due to the ability of the newly hatched larvae to pass through the perforated openings. Because of the extremely small size of these newly hatched larvae it is felt that some individuals escaped notice when the ears were disinfected (by clipping) before the bags made of plain "Cellophane" and paper were applied. This probably accounted for most of the infestations found in ears where these coverings were used.

Wrapping Increased Sales

Although no detailed figures are available, some attention was given to the problem of marketing ears slightly injured by the corn ear worm. In preliminary tests the husks were removed from infested ears, together with all worms, frass, etc. These ears showed for the most part light tip injury which affected only the kernels in the tip region. All traces of this injury were cut off with a sharp knife and the ears were wrapped in "Cellophane" and sold as soon as possible at a rate somewhat lower than worm-free corn of the same variety. In these trials the ears were wrapped individually in "Cellophane" and also were sold in groups of six in bags made of "Cellophane". It was found that the ears wrapped in "Cellophane" were marketed without difficulty at roadside stand. Because the corn was sold soon after picking cooling treatments were not given.

It is realized that "Cellophane" cellulose film is a quality product and should be used mainly on first quality materials, although in 1935 it was the means of salvaging much corn that would otherwise have been a total loss. It appears that growers and roadside stand owners are interested in the marketing of sweet corn in this manner and it is hoped that serious studies in this direction can be made another year. At present it would appear that new uses for "Cellophane" in the field of sweet corn marketing offer probably more possibilities than the use of this material for the field control of the corn ear worm.

* The word "Cellophane" is a registered trade-mark of the Du Pont Cellophane Company, Inc., 350 Fifth Avenue, New York, N. Y.

** The word "Dutox" is a registered trade-mark of the Grasselli Chemical Company, Cleveland, Ohio.

THE EQUIPMENT AND PROCEDURE FOR TREATING SEED WITH DUST DISINFECTANTS ON A COMMERCIAL SCALE

EDITOR'S NOTE:- The acceptance of seed treatment as standard practice, like the adoption of commercial fertilizers at an earlier period, has been slower than it should be when the potential benefits are considered. However, seed disinfection is constantly commanding more attention as is evident from the fact that treating is increasingly being done on a commercial basis.

By G. F. Miles, Chief Plant Pathologist,
Bayer-Semesan Company, Wilmington, Del.

A circular entitled "Commercial Seed Treating" and containing suggestions about treating equipment, its location, and methods of disinfection has recently been issued by a manufacturer of seed disinfectants.*

Although, as the title of the circular indicates, the information in it is intended primarily for the use of seedsmen, custom treaters, elevators and other concerns treating seed on a large scale, many of the suggestions apply equally well to the treatment of seeds on the farm.

We have selected from the circular those paragraphs which are of general interest to all users of dust disinfectants for the treatment of seeds. It may be well to explain that the volatile dusts referred to include such disinfectants as formaldehyde dusts, ethyl mercury chloride and ethyl mercury phosphate. The non-volatile dusts are such as copper carbonate, copper oxide, hydroxymercurichlorophenol and hydroxymercurinitrophenol.

Condition of Seed

Successful treating depends to a considerable extent on the condition of the seed when treated and on its subsequent care. Prior to treatment the seed should be thoroughly cured or dried. Failure to observe this precaution may result in injury to the seed by the dust disinfectant or by heating in the storage bins or sacks after treating. In addition to being well-cured, the seed should be cleaned to remove all light or shriveled seed, weed seeds, trash, smut balls, and dirt. The cost of cleaning seeds is relatively small compared with the additional profits to be had from planting good, sound, clean seed of high germination properties.

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Use Recommended Dosages

Regardless of the disinfectant used, it is usually unwise to apply more or less than the recommended amount. Applying excessive quantities of dust may injure the seed, cause undue wear on the machinery, and make the handling and planting of the seed disagreeable and even dangerous. Using less than the recommended amount of dust per bushel of seed invites poor disease control and a loss in yield and quality of the crop.

Seed Treating Equipment

Most of the seed treating machines fall into either of two classes: rotary or gravity type. A third class, consisting essentially of a spiral conveyor, is also used for the treatment of cotton seed.

Rotary Type Treaters

Whether rotated by hand or mechanically, this type of treater should not be operated more than half-full of seed. This precaution is necessary to permit the seed to roll and tumble so as to coat it thoroughly with the dust. This is the only type of machine generally recommended for use in applying non-volatile dusts. It is suitable also for application of volatile dusts. Rotary treaters are manufactured in several sizes, the capacities of which can be secured from the respective manufacturers. In general, the capacities for various makes range between 50 and 150 bushels per hour.

Gravity Type Treaters

For the treatment of seeds with volatile dusts, the gravity type machine provides an extremely rapid method. The dust and seed pass downward by gravity through the machine over a system of cones and funnels or baffles, which accomplish the treating. The dust may be added by hand or automatically by a dust feed mechanism operated by the flow of grain or by an electric motor. Capacities vary from 50 to 500 bushels per hour.

Blue print patterns for making a home-made gravity treater or directions for making a hand operated rotary machine may be secured without charge.

Housing the Treater

Regardless of the type of treating machine or dust disinfectant used, the treater should always be so located in a building that any flying dust which may arise from its operation will be carried quickly out of doors. It is preferable to locate the treating equipment where there is excellent two-way ventilation.

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Storage of Treated Seed

In storing treated seed, only the usual storage precautions are necessary, excepting that seed treated with a volatile disinfectant should never be stored in air-tight containers. The storage space must be dry.

The length of time for which it is advisable to store dust-treated seed depends somewhat on the type and condition of the seed, the nature of the disinfectant, and certain other factors. In general, treated seed may be stored for several months without significant injury, provided the proper dosage of dust has been used and other precautions as to seed condition, storage, etc., have been observed.

For most or all of the volatile dusts it is advisable to hold the treated seed in sacks or in bulk for at least 24 hours before planting, or according to the manufacturer's directions. In the case of the non-volatile dusts this practice is probably not necessary.

Personal Precautions

Those working with disinfectants, which depend on toxic or poisonous ingredients for their efficiency in disease control, should thoroughly wash their hands, face, and exposed portions of their bodies at least twice a day.

The volatile types of dusts should not be permitted to remain on the skin, especially when it is perspiring. Avoid also getting any dust in the eyes, in gloves, up the sleeves, etc. Follow explicitly the precautions given by the manufacturer of each product.

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* The manufacturer referred to is the Bayer-Semesan Company, Wilmington, Delaware. Copies of the circular may be obtained on request. Among the products of this company are those sold under the registered trade names of "Ceresan," "Semesan Jr.," "Semesan Bel" and certain others.

HELPING THE FARMER TO HELP HIMSELF CAN ASSIST IN SOLVING HIS PROBLEMS

EDITOR'S NOTE:- This discussion of the importance of better farm practices was written for Commercial Fertilizer, Atlanta, Georgia, by Dr. F. W. Parker, agronomist, E. I. du Pont de Nemours & Company.

So much has been written about farm problems that one hesitates to add to the already voluminous record. At the invitation of the Editor, however, a practical means of achieving an improved standard of living is pointed out, particularly as relating to farmers in the southeastern states.

The average farm in North Carolina, South Carolina, Georgia, and Alabama has 32 acres of crop land. In 1930, the average farm included 10 acres of corn and 11 acres of cotton. The 10-year average yield of corn is only 14 bushels per acre, making an average production of 140 bushels per farm; and the corresponding average yield of cotton is approximately 200 pounds of lint per acre, or slightly more than 4 bales per farm. In 1929, the value of all crops produced on the 32 acres was only $875.00. Of this amount more than one-half was consumed on the farm, so that the average cash income was quite inadequate.

In order to achieve a higher standard of living, the southern farmer should produce more on his 32 acres of crop land. He need not increase cotton production per farm, but he should produce his four bales on five or six acres. Much of the increased production of feed and livestock products could and should be consumed on the farm to increase living standards and to avoid or reduce cash expenditures for feed for both livestock and the farm family.

How to Increase Yields

Increased production can easily be achieved by methods already used by the better farmers and advocated by agricultural experiment stations. The possibility of higher production per acre with a corresponding low cost of production was shown by J. W. Tidmore of the Alabama Agricultural Experiment Station, in a paper presented at the recent meeting of the Association of Southern Agricultural Workers. Dr. Tidmore reported that in extensive experiments in Alabama the combined use of winter legumes and commercial fertilizer had increased cotton yields from 795 pounds of seed cotton to 1,433 pounds per acre. In the same experiment the yields

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of corn were increased from 16 to 40 bushels per acre. The increased yield of cotton was secured at a cost of 1.8 cents per pound of lint for fertilizer and legume seed. The 24-bushel increased yield of corn resulted at a cost of eight cents per bushel of corn for fertilizer and legume seed.

When the southern farmer increases production per acre so that four bales of cotton are grown on five or six acres and yields of corn average 30 to 40 bushels instead of 12 or 15 bushels, he will have a better standard of living. The increased food production will enable him to keep more cows, hogs and chickens, and his family can enjoy better living conditions at a lower cash outlay than now prevails. These are ways by which the farmer can improve his status without waiting for the next wave of legislative farm relief.

THE RELATION OF SCIENCE TO THE CONSERVATION AND INCREASE OF NATIONAL WILD LIFE OUTLINED

EDITOR'S NOTE:- The following is the text of a radio address given during the National Farm and Home Hour over a coast-to-coast NBC-WJZ network. The address was delivered from the NBC Radio City studios in New York City.

By Lithgow Osborne, Conservation Commissioner, State of New York, Albany, N. Y.

There was a time not many years back when we regarded the conservation of our wild life resources as something that was completely in the hand of Providence. Of course we human beings could refrain from taking some of the gifts in fish and game which Providence had bestowed upon us; but aside from such passive measures as the restriction of open seasons and bag limits, we left the job to Nature. In these later years the conviction has grown that in conservation, as in other things, the Lord helps those who help themselves. It is true, in the words of the poet, that "only God can make a tree" - or for that matter a ruffed grouse or a pheasant or a brook trout; but we have learned that there are a lot of things we can do - which we have largely failed to do as yet -- to assist the processes of nature.

For instance, we have found that the various species of trout and such game birds as pheasants and quail can be artificially propagated. In various other fields we have found that so far as our wild life resources are concerned the situation is within human control to a very considerable extent; and that the amount of game and fish we have in this country depends very largely upon the amount of effort and sacrifice which we are willing to make in its behalf.

Science in Game Management

More and more conservationists are beginning to talk in terms of game management. It is one of the youngest of the sciences. It is at least 25 years behind forestry which, so far as this country is concerned, became a science only during the present century.

Perhaps the two outstanding examples of game management with which nearly everyone is familiar are the introduction of the pheasant and the German brown trout into this country. Both these achievements were the result of trial-and-error or hit-and-miss methods. There was more luck than science in them. A gentleman out in Oregon saw some pheasants over in China, brought them home with him and found

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that they survived well in this country. About the same thing happened with the German brown trout.

Today scientific experimentation has proceeded far beyond such crude, even though highly successful, efforts. It has still only made a start. In laboratories and in field stations all over this country there are scientists at work seeking the answers to the thousand and one questions about wild life which still remain unsolved, and evolving new methods, more economical and efficient methods, of restoring those resources. Some of the questions have been answered - enough to assure us that we are justified in more than a passive attitude. We should no longer depend solely upon an attitude of self-restraint in the amount of fish or game which we take. Scientific investigation is of greater significance than laws; the technician has become more important than the game warden.

Pheasant Production Costs Reduced

Let me give a further illustration. I have spoken of the pheasant. Since this species was introduced it has spread throughout the northern states. In many localities it is very abundant. What is the history of this increase? The story in New York State - and it is very similar to what has taken place elsewhere - is simply this. The birds imported thrived but they did not spread very fast. Bringing them from abroad was expensive. So in 1909 there was established, at Sherburne, New York, a state game farm which is today the oldest game bird farm in existence. Since then state game farms in New York State alone have poured into the coverts a steady stream of pheasants aggregating 300,000.

Up until the past few years the feathered skirts of the "little brown hen" annually mothered thousands of youngsters and taught them what day-old pheasant chicks should know, quite untroubled by a squad of curiosity-impelled scientists who were busily at work on another scheme - the artificial incubation of game bird eggs and the care of the resulting chicks. Bespectacled science won with the result that in the past few years electric incubators that can comfortably handle up to 10,000 eggs at a setting, and electric hovers, with their ample flannel skirts, can today mother 400 downy day-olds with scarcely greater cost than did the broody hen mother fifteen.

Simply because science "learned how" costs of rearing pheasants for liberation have nose-dived to a new all-time low, well under a dollar per bird, and production of pheasants has skyrocketed to a new all-time high last year of 41,322 birds, nearly three times as many as were produced at the same number of game farms three years ago, at very nearly the same actual expenditure of cash. In other words, thanks to years of careful scientific research, carried on by various colleges and state game commissions, the sportsman's dollar today buys nearly three times as many pheasants

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as it did ten years ago, and at least five times as many as it did twenty years ago.

That is simply an illustration of what scientific research and study can do for the preservation and restoration of our wild life resources. Any conservationist who does not give all the aid and support he can to the effort to apply scientific methods to the conservation and restoration of our wild life resources is missing the one best chance of helping the cause in which he is interested.

CLEARING FARM LANDS OF OBSTRUCTIONS TO SHIFT FROM SOIL-DEPLETING TO SOIL-CONSERVING CROPS

EDITOR'S NOTE:- In view of the growing realization of the importance of conserving and rebuilding crop lands, suggestions are made here as to how farmers can protect soil from further depreciation.

By L. F. Livingston, Manager,
Agricultural Extension Section,
E. I. du Pont de Nemours & Co.,
Wilmington, Delaware.

The tremendous damage done to farm lands by excessive rainfall and floods in many States serves to emphasize the need for shifting from soil-depleting crops to soil-building crops. More than ever before farmers must give attention to making their farms better and more permanent producing units.

Producers of all sorts of goods from neckties to structural steel must, to operate at a profit, keep their manufacturing equipment in repair and, when necessary, replace it with new equipment. The farmer, however, must choose between maintaining his "plant" or moving to a new farm, the soil of which has not been "cultivated out."

Fertilizers can increase the productivity of soil, but the best of these agricultural aids cannot provide new topsoil. The two-foot or so layer of soil cannot be replaced once it is gone, but it can be conserved.

In carrying out a soil-maintenance program, the farmer can devote to pasture parts of his land long used for the growing of crops that deplete soil or plant crops that conserve and build up soil. He then can break his pasture or other land that has not been depleted by certain crops and which has been protected against erosion by water or wind.

Preparing Land for Cultivation

To permit making the changes, it may be necessary to drain bottom land or other areas that are wet so that crops may be grown without danger from water. In some cases, it will be required that random stumps be removed or field boulders taken out. Such improvement is imperative where modern powered farm machinery is used. Even land to be worked with horse-drawn implements should be free of obstructions.

THE NATIONAL UNIVERSITY OF LA PLATA ISSUES REPORTS ON STUDIES IN AGRONOMY IN ARGENTINA

Agricultural News Letter acknowledges with thanks two copies of the "Revista de la Facultad de Agronomia" from the Universidad Nacional de La Plata of the Argentine Republic. One of these is dated December 1934 and the other December 1935.

It is well known that the National University of La Plata is doing most important work in its Faculty of Agronomy. These two reports bear out the well merited reputation of this educational institution.

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